

JAPAN

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WHAT IS CLAIMED IS:

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1. A locating unit equipped with a locating pin to be inserted through a locating bore formed in a work for positioning and supporting the work in a fixed place, said locating unit comprising:
 - a locating pin having a root portion formed with a work seating surface; and
 - a work seating detection mechanism mounted at said root portion and detecting the presence of seating of said work on said work seating surface.
 2. The locating unit according to claim 1, further comprising:
 - a clamp unit internally located in said locating pin and clamping said work in a fixed place after said work has been positioned with said locating pin.
 3. The locating unit according to claim 1, wherein:
 - said work seating detection mechanism includes a detection pin which is able to protrude or retract from the work seating surface; and wherein:
 - said work seating detection mechanism is operative to detect the presence of seating of said work in response to a protruding or retracting movement of said detection pin caused by seating or unseating phase of said work.
 4. A vehicle body assembly machine for implementing a relative positioning operation among a plurality of panel-shaped works, which form a part of a vehicle body of an automobile, prior to welding and joining the plurality of the works, said vehicle body assembly machine comprising:
 - a plurality of locators independently mounted for respective works and each including a locating unit mainly constructed of a locating pin for positioning and supporting each of said works, said locating unit having a capability of self-isolating movement to provide a function of arbitrarily altering at least a two-dimensional position of said locating unit;
 - wherein said locators individually perform said self-isolating movements between work set positions, wherein said works are set with respect to said

respective locators, and a relative-positioning final location, wherein a mutual relative-positioning operation of said works are finally implemented, to individually move said locating units in forward or retracted directions to perform said mutual relative-positioning operation among said works; and

5 each of said locating units includes a locating pin adapted to be inserted through a locating bore formed in each of said work for positioning and supporting said each work, said locating pin having a root portion formed with a work seating surface, and a work seating detection mechanism mounted at said work seating surface for detecting the presence of seating of said each work on said work seating surface.

10 5. The vehicle body assembly machine according to claim 4, wherein:

each of said locators has an operating freedom in orthogonal three axes to allow a relevant locator to have a self-isolating movement for enabling a three-dimensional position of the relevant locator to be arbitrarily altered.

15 6. The vehicle body assembly machine according to claim 5, wherein:

said plurality of locators are located for each of said works and are operable to move said locating units in said forward or retracted directions in a mutual synchronism with one another during the relative positioning operation of said work in the mutual relationship.

20 7. A locating unit equipped with a locating pin to be inserted through a locating bore formed in a work for positioning and supporting the work in a fixed place, said locating unit comprising:

locating means having a root portion formed with a work seating surface; and

25 detection means located at said work seating surface for detecting the presence of seating of said work on said work seating surface.

30 8. A vehicle body assembly machine for implementing a relative positioning operation among a plurality of panel-shaped works, which form a part of a vehicle body of an automobile, prior to welding and joining the plurality of the work, said vehicle body assembly machine comprising:

means for positioning and supporting each of said works and including a plurality of locating units each having a capability of self-isolating movement to provide a function of arbitrarily altering at least a two-dimensional position of said locating unit:

5 wherein said positioning and supporting means perform said self-isolating movements between work set positions, wherein said works are set with respect to said respective locating units, and a relative-positioning final location, wherein a mutual relative-positioning of said works are finally implemented, to individually move said locating unit in forward or retracted directions to perform said mutual relative-positioning operation among said works; and

10 each of said locating units includes a locating pin adapted to be inserted through a locating bore formed in each of said work for positioning and supporting said each work, said locating pin having a root portion formed with a work seating surface, and a work seating detection mechanism mounted at said work seating surface for detecting the presence of seating of said each work on said work seating surface.

9. A method for positioning and supporting a work in a fixed place with a locating unit equipped with a locating pin to be inserted through a locating bore formed in the work, said method comprising:

25 preparing a locating pin having a root portion formed with a work seating surface, a work seating detecting mechanism mounted at said work seating surface and a clamp arm operable within said locating pin;

positioning and supporting said work on said work seating surface;

detecting the presence of seating of said work on said work seating surface with said work seating detection mechanism at said root portion; and

clamping said work on said work seating surface with said clamp arm.

30 10. A method for implementing a relative positioning operation among a plurality of panel-shaped works, which form a part of a vehicle body of an automobile, prior to welding and joining the plurality of the works, said method comprising:

preparing a plurality of locators independently mounted for respective

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works and each including a locating unit having a capability of self-isolating movement to provide a function of arbitrarily altering at least a two-dimensional position of said locating unit, said locating unit including a locating pin adapted to be inserted through a locating bore formed in each of said work for positioning and supporting said each work, said locating pin having a root portion formed with a work seating surface, and a work seating detection mechanism mounted at said work seating surface;

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operating said locators individually to perform said self-isolating movements between work set positions, wherein said works are set with respect to said respective locators, and a relative-positioning final location, wherein a mutual relative-positioning operation of said works are finally implemented to individually move said locating units in forward or retracted directions while performing said mutual relative-positioning operation among said works;

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detecting the presence of seating of said works on said work seating surface with said work seating detection mechanism; and

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clamping said works in said relative-positioning final location.